

Microbubble and disinfectant wash for the safety of leafy vegetables

Researchers from the University of Kasetsart in Bangkok applied the microbubble (MB) technology to the washing process of leafy vegetables to assess its effectiveness in reducing microbial contamination.

They also determined the effectiveness of MBs ($\emptyset \sim 50-70 \mu\text{m}$) combined with three disinfectants - acidic electrolyte water (AEO: 20 and 40 mg/L; ORP: 910-1010 mV; pH: 2.7-3.1), chlorine dioxide (ClO_2 : 3 and 5 mg/L; ORP: 550-680 mV; pH: 7.1-7.5) and sodium hypochlorite (NaOCl: 40 and 80 mg/L; ORP: 900-990 mV; pH: 6.5-6.7) - in order to inactivate *Escherichia coli* and *Salmonella Typhimurium* on artificially-contaminated basil and Thai mint.

Although microbubbles alone do not possess antimicrobial properties, the combination with two oxidant disinfectants (NaOCl and AEO) for 5 minutes determined an effective reduction of *S. Typhimurium* and *E. coli* on both plants with 2-3 log reductions (99.2-99.8%).

Washing the leaves with MB and NaOCl at a concentration of free chlorine of 40 mg/L of NaOCl or 20 mg/L or AEO had the best results in killing *S. Typhimurium* with 1.21-1.90 and 0.67-2.25 log reductions respectively. In addition, the reduction of *E. coli* and *S. Typhimurium* on basil resulted higher than on Thai mint.

"Differences in surface roughness can help bubbles and disinfectant additives detach bacterial cells, therefore making the washing process more effective. What is more, the addition of disinfectants to the washing solution is a powerful means of killing planktonic *E. coli* and *S. Typhimurium* in the washing water, thus preventing cross-contamination."

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